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(54) Skate with aligned wheels.

(57) A skate with aligned wheels including a support (2) for an item of footwear (3) from which a frame (4) protrudes downward. A pivot (10) for the facing end of a wheel supporting truck (13) is associated transversely at at least one end of the frame. A spring members (15) suitable to control the mutual oscillation of the frame and of the truck is interposed between the truck and the frame. The invention is simple to industrialize and provides the user with shock-absorption during sports practice.

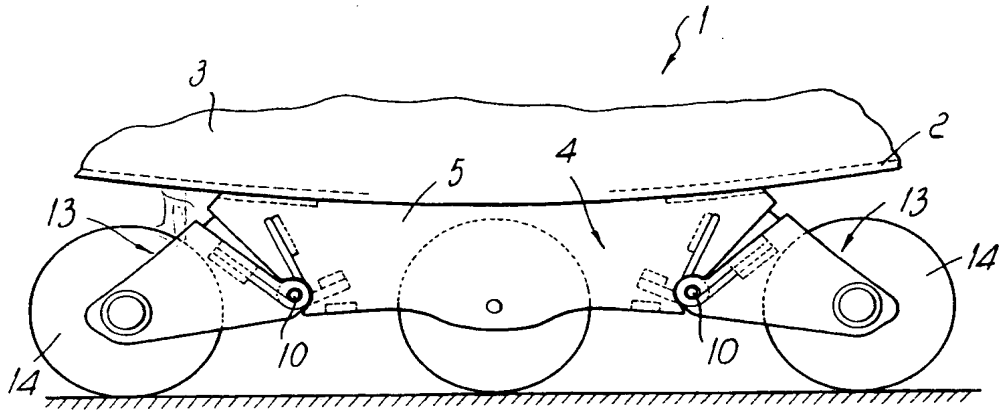

Fig. 1

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The present invention relates to a skate with aligned wheels.

A first conventional type of skate with aligned wheels has a support for an item of footwear from which two longitudinal shoulders protrude; a plurality of aligned wheels is pivoted between the shoulders.

This first conventional skate has some problems: the fact that the aligned wheels are pivoted in a fixed manner to the pair of wings entails a direct transmission to the item of footwear of all the stresses due to the uneven parts of the ground encountered during sports practice, with consequent discomfort for the user.

The structural rigidity of this known solution furthermore entails the transmission of vibrations to the item of footwear and therefore to the legs of the user which hinder his/her sports performance.

A sports implement is also known which is predominantly used by skiers for summer practice on roads and is composed of a support for an item of footwear from which a frame protrudes downward and centrally. The ends of two pairs of wheel supporting trucks are independently pivoted to the frame, and the head of a screw with a threaded stem is connected to the support in the interspace between two adjacent wheels. A complementarily threaded nut is associated with the threaded stem and abuts on the ground-facing surface of a connecting element which is arranged transversely to each pair of trucks. A cylindrical helical compression spring is arranged coaxially to the stem.

This known solution, disclosed in the Italian Application No. 21821 B/85, allows, by adjusting the packing of the spring, to vary the angle defined between each pair of wheel supporting trucks and the ground.

In this solution, the adjustment of the degree of packing of the spring only allows to vary the condition of use of the implement during the sports practice of slalom; when the adjustment of the spring is at its minimum setting, i.e. when the spring is not compressed, it is in fact possible to achieve easy use for the practice of slalom, but one also observes yielding during pushing and when traveling along straight paths, with a considerable degradation of athletic performance.

When the adjustment of the spring leads to a gradual compression thereof, the outermost wheels of the truck pairs are raised and thus separate from the ground to a more or less significant extent; this condition may improve the use of the implement during the practice of slalom, but this again entails a non-optimum and thus unstable condition during straight paths and therefore during the practice of speed skating, and in any case all the vibrations due to impacts against protrusions of the ground or due to uneven parts of said ground are transmitted to the item of footwear and therefore to the legs of the user.

A further disadvantage of this solution resides in the fact that the placement of the springs with respect to the pivoting points of the wheel supporting trucks is decisive for the good operation of the device, since the springs are arranged further outward than the fulcrums in order to be able to act by compression.

Furthermore, in this known solution the stresses to which the truck is subjected are transmitted by means of the spring to the support for the sole. The support must therefore be rigid, and this increases costs and reduces comfort for the user.

The length of the support for the sole must also be such as to allow its interaction and/or fixing with respect to the springs, and this limits the field of application to the larger shoe sizes.

The aim of the present invention is therefore to eliminate the problems described above in conventional types by providing a skate which allows to reduce the stresses transmitted to the legs of the user, caused by rough or uneven ground, keeping the position of the wheels constant with respect to the ground.

Within the scope of the above aim, another important object is to provide a skate which optionally allows the user to preset the degree of attenuation of said stresses according to a specific use.

A further object is to make the positioning of the elastically deformable elements and of the fulcrums of the wheel supporting trucks mutually independent, reducing bulk and simplifying the structure of the skate.

Another object is to provide a skate which can be used for any range of sizes.

Yet another object is to provide a skate which does not transmit the stresses of the truck directly to the sole support and allows to improve the comfort for the user.

Another object is to provide a skate which is structurally simple and easy to assemble.

A further object is to provide a skate which is easy to industrialize, reliable and safe in use and has low manufacturing costs.

This aim, these objects and others which will become apparent hereinafter are achieved by a skate with aligned wheels, comprising a support for an item of footwear from which a frame protrudes downward, characterized in that a pivoting pin for the facing end of a wheel supporting truck is associated transversely at at least one end of said frame, at least one means suitable to control the mutual oscillation of said frame and said truck being interposed between said truck and said frame.

Advantageously, said means is constituted by an elastically deformable element and/or by a mov-

able slider.

Further characteristics and advantages of the present invention will become apparent from the detailed description of some particular but not exclusive embodiments, illustrated only by way of non-limitative example in the accompanying drawings, wherein:

figure 1 is a partially sectional side view of a skate according to the invention;

figure 2 is a partially sectional side view of one end of the skate of figure 1 in a condition in which the elastically deformable element is not activated;

figure 3 is a view, similar to the preceding one, of a second embodiment of the invention;

figure 4 is a view, similar to the preceding one, of said second embodiment in the condition of maximum activation for the elastically deformable element;

figure 5 is a view, similar to the one of figure 1, of a third embodiment of the invention with the slider in the position suitable to allow the maximum oscillation between the truck and the frame;

figure 6 is a view, similar to the preceding one, of said third embodiment with the slider in the position for locking the mutual position of the truck and of the frame;

figure 7 is a detail view of the preceding embodiment;

figure 8 is a sectional detail view of the preceding embodiment;

figure 9 is a sectional view of the skate, taken along the plane IX-IX of figure 5;

figure 10 is a sectional view of a further embodiment of the invention;

figure 11 is a view, similar to the preceding one, of still a further embodiment;

figure 12 is a view, similar to the preceding one, of still a further embodiment.

With reference to the above figures, the skate, generally designated by the reference numeral 1, comprises a support 2 for an item of footwear 3 from which a frame 4 protrudes downward.

The frame is constituted by a first wing 5 which is preferably shaped like an inverted trapezoid with the shorter parallel side 6 directed toward the ground 7. A pivot 10 is transversely associated with the frame 4, at at least one end 8, at the first surface 9, which is lateral and preferably inclined with respect to the ground 7, and proximate to the connecting point between said first surface and the shorter parallel side 6.

The adjacent end 11 of the facing second surface 12 of a truck 13 which supports one or more wheels 14 is pivoted to the pivot 10.

A means suitable to control the mutual oscillation between the first surface 9 and the second surface 12, which face one another, is interposed between the truck 13 and the frame 4. The means is constituted by an elastically deformable element, such as a spring 15 which is arranged coaxially to the pivot 10 and has ends 16 and 17 which respectively interact in abutment with an adapted first lug 18, which protrudes, internally or externally, with respect to the frame 4, and are arranged between a pair of shoulders 19 which are mutually parallel and are formed internally or laterally with respect to the truck 13.

The spring 15 acts so as to mutually space the truck 13 and the frame 4.

In order to allow the truck 13 to limit its oscillation with respect to the frame 4, a second wing 20 protrudes from the frame at the end 11 to which the pivot 10 is pivoted and toward the frame 4. The second wing 20 oscillates between a second lug 21 and a third lug 22 which protrude internally or externally with respect to the frame 4.

A controlled oscillation within the frame 4 is thus allowed to the second wing 20.

Advantageously, a third wing 30 protrudes from the second surface 12 toward and within the frame 4 to guide the mutual sliding.

It has thus been observed that the skate according to the invention has achieved the above aim and objects, a skate with aligned wheels having been obtained which allows to reduce the stresses transmitted to the legs of the user as a consequence of rough or uneven ground; the skate being structurally simple, easy to assemble and industrialize and having modest manufacturing costs.

Furthermore, the placement of the spring 15 between the frame and the truck allows to adopt this solution even for small shoe sizes, because the length of the sole support is not linked to the extension of the truck.

The sole support can also be made of semirigid material, such as plastics, because it does not have to directly withstand the stresses of the spring, as instead occurs in the known art.

The skate thus conceived is susceptible to numerous modifications and variations, all of which are within the scope of the inventive concept.

Thus, for example, figures 3 and 4 illustrate a second embodiment of a skate 101 in which an adapted first seat 123 and a second seat 124 are formed, at the first surface 109 and at the second surface 112, for an elastically deformable element such as a cylindrical helical compression spring 115.

The spring 115 preferably has an axis defined approximately along an arc of a circle centered in the rotation point 110 of the truck 113, so as to compress optimally upon stresses imparted to the wheel 114.

The stroke limit is defined by the direct interaction between the first surface 109 and the second surface 112 or by the interaction of the second wing 120 with the third lug 122, as shown in figure 4.

Figures 5 to 9 illustrate a third embodiment of a skate 201, wherein the means suitable to control the mutual oscillation between the first surface 209 of the frame 204 and the facing second surface 212 of the truck 213 is constituted not only by an elastically deformable element, such as a spring 215 arranged coaxially to the pivot 210, as shown in the first embodiment, but also by a slider 225.

The slider has a stem 226 which can slide within a first slot 227 which is substantially L-shaped having a longer wing 228 arranged along an axis which is preferably approximately parallel to the plane of arrangement of the lateral surface 209.

The stem 226 also slides within a second longitudinal slot 229 formed on a third wing 230 which protrudes from the second surface 212 toward and within the frame 204, the second slot having such a shape as to be able to arrange itself at the longer wing 228 of the first slot 227.

Naturally, the arrangement of the first slot and of the second slot may be reversed, the first slot affecting the third wing 230, in this case with the shorter side of the L directed toward the tip of the truck 213, the second slot being formed at the frame 204.

When the slider 225 is thus arranged so that the stem 226 affects both the longer wing 228 of the first slot 227 and the second slot 229, oscillation between the truck 213 and the frame 204 is locked. If instead the stem 226 affects the shorter wing of the first slot 227 and the second slot 229, oscillation between the truck 213 and the frame 204 is allowed and is adjusted by the spring 215.

Figure 10 illustrates a further embodiment of a skate 301 whose frame 304 has, at at least one end 308, at the first surface 309, which is lateral and preferably arranged along a plane which is approximately perpendicular to the plane of the ground 307, a pair of shoulders 331 which are mutually identical and parallel and protrude in a direction which is approximately at right angles to the first surface 309.

The adjacent end 311, which protrudes from the second surface 312 of a truck 313, which supports one or more wheels 314, is transversely pivoted, by means of an adapted pivot 310, between the pairs of shoulders 331.

The first surface 309 and the second surface 312 thus face one another, and a first protrusion 332 and a second protrusion 333 protrude respectively from the surfaces at right angles, approximately at the same axis. A means suitable to control the mutual oscillation of the frame and of the truck is interposed coaxially to said protrusions and is constituted by an elastically deformable element such as a spring 315.

In this case, too, the spring is compressed optimally, absorbing the stresses imparted to the truck by the wheel 314.

The stroke limit is defined by the direct interaction between the lower surface of the support 302 and the underlying third upper surface 334 of the truck 313.

Figure 11 illustrates a further embodiment of a skate 401 which comprises a frame 404 which has a first surface 409 preferably arranged along a plane which is approximately at right angles to the plane of arrangement of the ground 407. A pair of shoulders 431 protrudes approximately at right angles from said first surface.

The pair of shoulders 431 is adjacent to the lower surface of the support 402.

The adjacent end 411 of a truck 413 which supports one or more wheels 414 is transversely pivoted, by means of a pivot 410, at the pair of shoulders 431.

A cavity 435 is formed at the end 411 in a region adjacent to the ground 407 and acts as seat for a fourth wing 436 which protrudes at right angles to the first surface 409 of the frame 404.

The fourth wing 436 is positioned within the cavity 435 by means of an adapted first hole 437 defined on the truck.

A washer 440 can also be arranged within the cavity 435, so that it can be removed by means of an adapted screw 438 which can be inserted through said truck through an adapted second hole 439 formed thereon. The washer is arranged on the head of said fourth wing 436.

A means suitable to control the mutual oscillation of the frame and the truck, constituted by a spring 415, can thus be arranged within the cavity 435 coaxially to said fourth wing 436.

A further embodiment of a skate 501 is illustrated at figure 12. The skate 501 has, at at least one end, a first surface 509 arranged approximately at right angles to the ground 507 and from which a pair of shoulders 531 protrudes in a region adjacent to the lower surface of the support 502. The end 511 of a truck 513 is transversely pivoted between the shoulders by means of an adapted pivot 510.

Below the first surface 509 and approximately parallel thereto there is a fourth surface 541 which faces the second surface 512 of the truck 513. A first seat 523 and a second seat 524 are respectively formed at the fourth and second surfaces, and a first crosspiece 542 and a second crosspiece 543 are arranged between the seats. A means suitable to control the mutual oscillation of the

frame and the truck is interposed at said crosspieces and is constituted by a cylindrical helical extension spring 515.

Naturally, the materials and the dimensions of the individual elements which constitute the skate structure may be the most appropriate according to the specific requirements.

Where technical features mentioned in any claim are followed by reference signs, those reference signs have been included for the sole purpose of increasing the intelligibility of the claims and accordingly, such reference signs do not have any limiting effect on the scope of each element identified by way of example by such reference signs.

Claims

1. Skate with aligned wheels, comprising a support (2,302,402,502) for an item of footwear (3) from which a frame (4,104,204,304,404,504) protrudes downward, characterized in that a pivot (10,110,210,310,410,510) is associated transversely at at least one end of said frame for pivoting the facing end of a wheel supporting truck (13,113,213,313,413,513), at least one means (15,115,215, 315,415,515) suitable to control the mutual oscillation of said frame and said truck being interposed between said truck and said frame.

2. Skate according to claim 1, characterized in that said frame is constituted by a first wing (5) shaped like an inverted trapezoid with the shorter parallel side (6) directed toward the ground, said frame having said pivot (10) which is transversely associated therewith at at least one end (8) at a first surface (9) which is lateral and inclined with respect to the ground and proximate to the connection of said first surface to said shorter parallel side (6).

3. Skate according to claim 2, characterized in that an adjacent end (11) of a facing second surface (12) of said wheel supporting truck is pivoted to said pivot, said means (15) suitable to control the mutual oscillation between said first surface of said frame and said second surface of said truck, which face one another, being interposed between said truck and said frame.

4. Skate according to claim 3, characterized in that said means is constituted by an elastically deformable element, such as a spring (15) arranged coaxially to said pivot (10), said spring having an end (16) which interacts in abutment with an adapted first lug (18) which protrudes from said frame, an other end (17) being arranged between a pair of shoulders (19) which are mutually parallel and formed at said truck.

5. Skate according to claim 4, characterized in that a second wing (20) protrudes, in order to allow said truck to limit its oscillation with respect to said frame, at said end (11) to which said pivot is pivoted and toward said frame, said second wing oscillating between a second lug (21) and a third lug (22) which protrude internally and transversely to said frame.

6. Skate according to one or more of the preceding claims, characterized in that a first seat (123) and a second seat (124) for an elastically deformable element, such as a cylindrical helical compression spring (115), are formed at said first lateral surface (109) of said frame (104) and at said second surface (112) of said truck (113).

7. Skate according to claim 6, characterized in that said spring has an axis approximately extending along an arc of a circle centered in the rotation point (110) of the truck.

8. Skate according to claim 7, characterized in that the stroke limit for said spring is constituted by the interaction of a second wing (120) with a third lug (122).

9. Skate according to one or more of the preceding claims, characterized in that said means suitable to control the mutual oscillation between a first surface (209) of said frame (204) and a second surface (212) of said truck (213) is constituted by a slider (225) which has a stem (226) slideable within a first slot (227) which is substantially L-shaped with a longer wing (228) extending along an axis which is approximately parallel to the plane of arrangement of said lateral surface (209) of said frame.

10. Skate according to claim 9, characterized in that said stem furthermore slides within a second longitudinal slot (229) formed on a third wing (230) which protrudes from said second surface toward and within said frame, said second slot having such a shape as to be able to arrange itself at said longer wing of said first slot.

11. Skate according to one or more of the preceding claims, characterized in that said frame (304) has, at at least one end (308), at a first

surface (309), which is lateral and arranged along a plane which is approximately at right angles to the plane of the ground (307), a pair of shoulders (331) which are identical and parallel and protrude in a direction which is approximately at right angles to said first surface.

12. Skate according to claim 11, characterized in that an adjacent protruding end (311) of a second surface (312) of said truck is transversely pivoted, by means of an adapted pivot (310), between said pair of shoulders (331), said first (309) and second (312) surfaces facing one another, a first protrusion (332) and a second protrusion (333) extending respectively at right angles from said surfaces, approximately at the same axis, a means suitable to control the mutual oscillation being interposed coaxially to said protrusions, said means being constituted by an elastically deformable element such as a spring (315).

13. Skate according to claim 12, characterized in that the stroke limit of said truck is constituted by the direct interaction between a lower surface of said support (302) and an underlying third upper surface (334) of said truck.

14. Skate according to one or more of the preceding claims, characterized in that said frame (404) has a first surface (409), arranged along a plane which is approximately at right angles to the plane of arrangement of the ground (407), a pair of shoulders (431) protruding from said surface approximately at right angles and is adjacent to the lower surface of said support.

15. Skate according to claim 14, characterized in that an adjacent end (411) of said truck (413) is pivoted transversely, by means of said pivot (410), at said pair of shoulders, a cavity (435) being formed at an end (411) in a region adjacent to the ground (407), said cavity acting as seat for a fourth wing (436) which protrudes at right angles to said first surface of said frame.

16. Skate according to claim 15, characterized in that said fourth wing is arranged within said cavity by means of an adapted first hole (437) formed on said truck, a washer (440) for the abutment of a spring (415), which can be positioned on the head of said fourth wing, being arrangeable within said cavity so that it can be removed by means of an adapted screw (438) insertable through said truck through an adapted second hole (439) formed thereon.

17. Skate according to claim 16, characterized in that a means suitable to control the mutual oscillation of said frame and said truck can be positioned in said cavity coaxially to said fourth wing, said means being constituted by said spring.

18. Skate according to one or more of the preceding claims, characterized in that said frame has, at at least one end, a first surface (509), arranged approximately at right angles to the ground (507), from which a pair of shoulders (531) protrudes in a region adjacent to the lower surface of said support (502), an end (511) of said truck (513) being transversely pivoted between said shoulders by means of said pivot (510).

19. Skate according to claim 18, characterized in that a fourth surface (541) is formed below said first surface and approximately parallel thereto, said fourth surface facing said second surface of said truck, a first seat (523) and a second seat (524) being formed at said fourth and second surfaces, a first crosspiece (542) and a second crosspiece (543) being arranged between said seats, said means suitable to control the mutual oscillation of said frame and said truck being interposed at said crosspieces, said means being constituted by a spring (515).

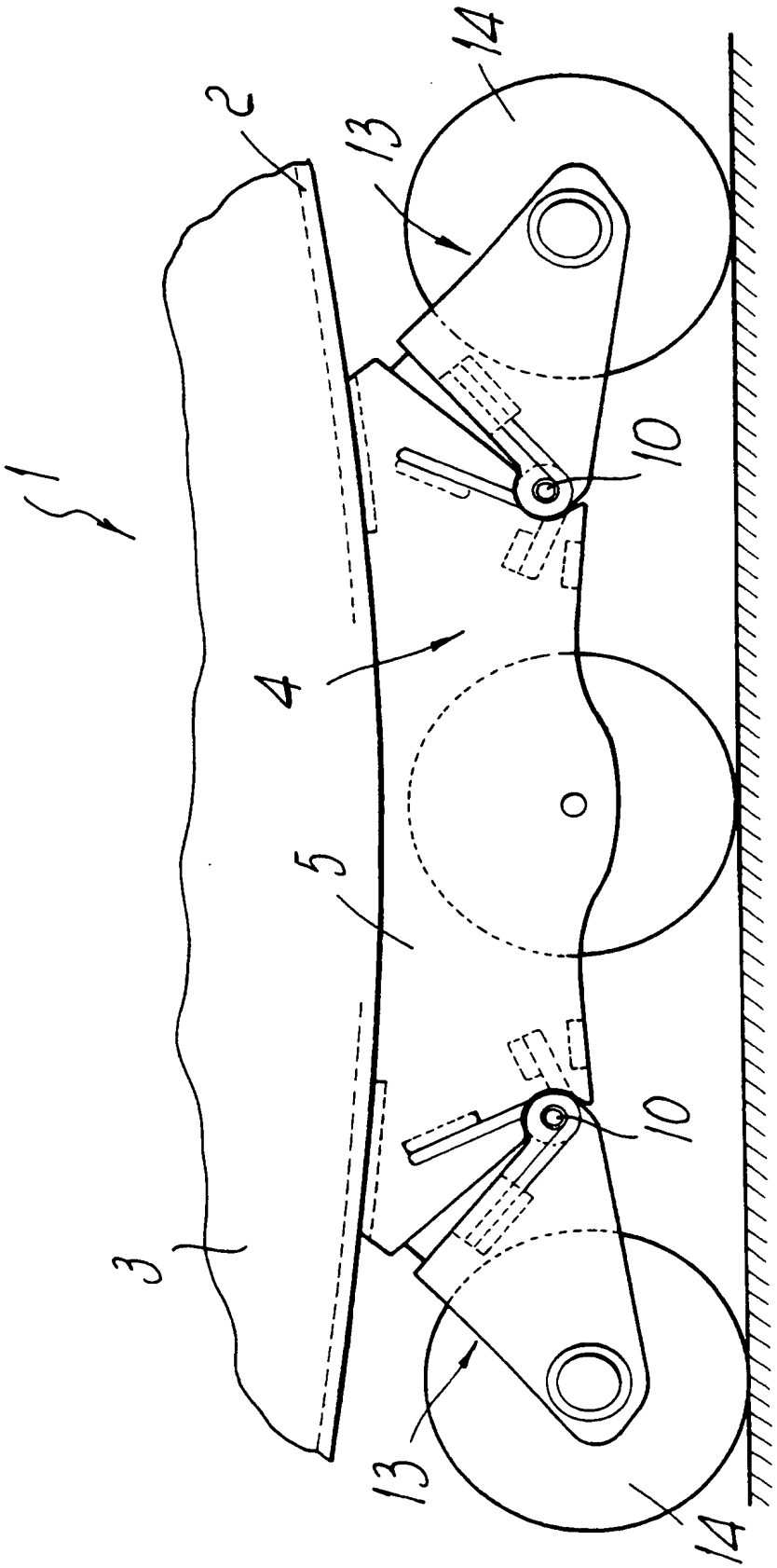

Fig. 1

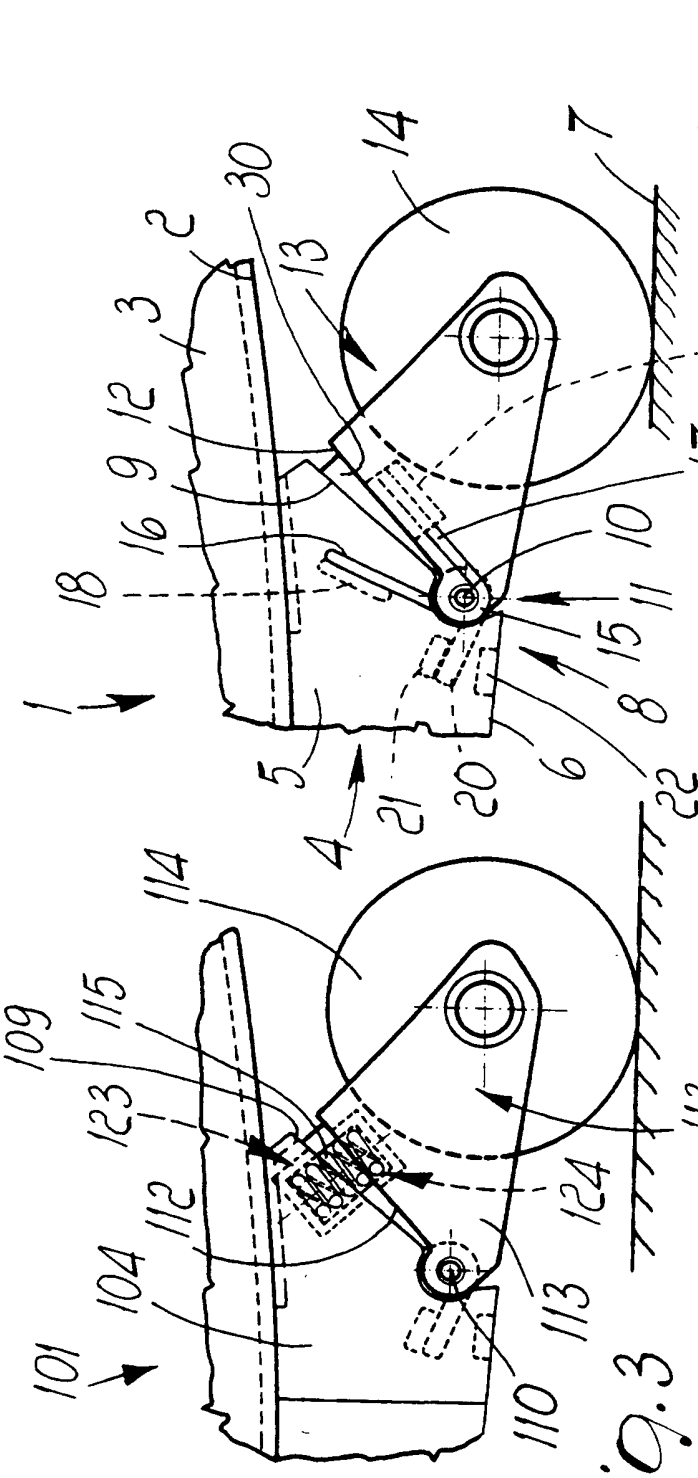

Fig.2

Fig.3

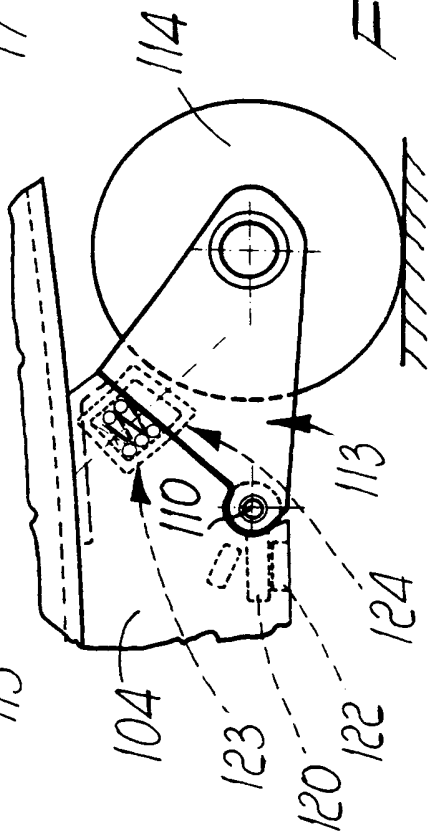

Fig.4

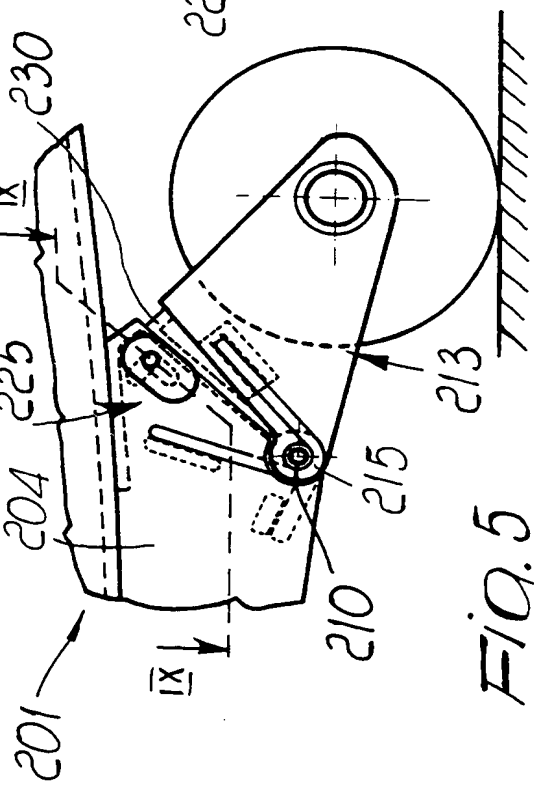

Fig. 5

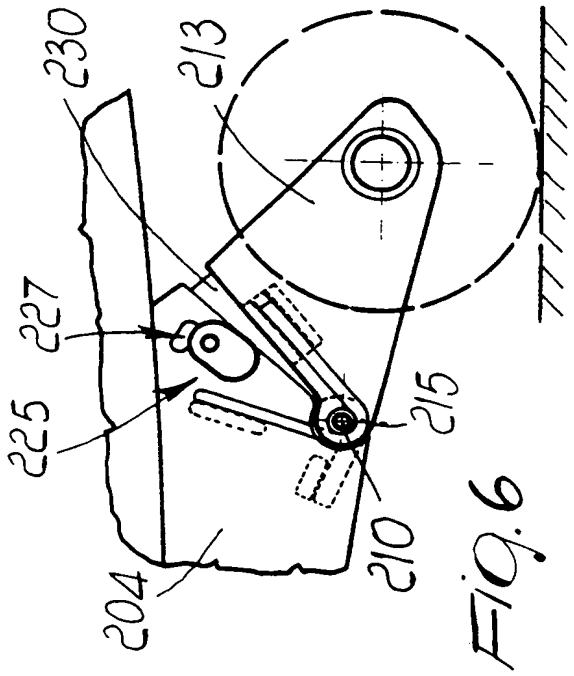

Fig. 6

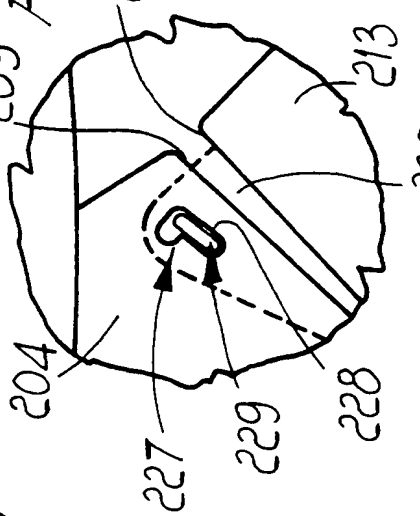

Fig. 7

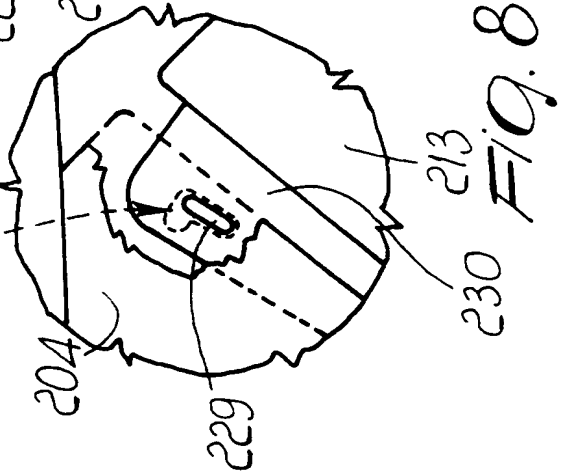

Fig. 8

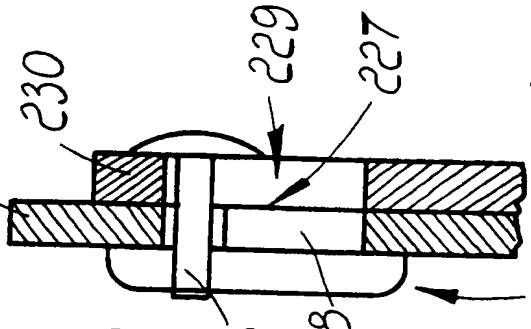

Fig. 9

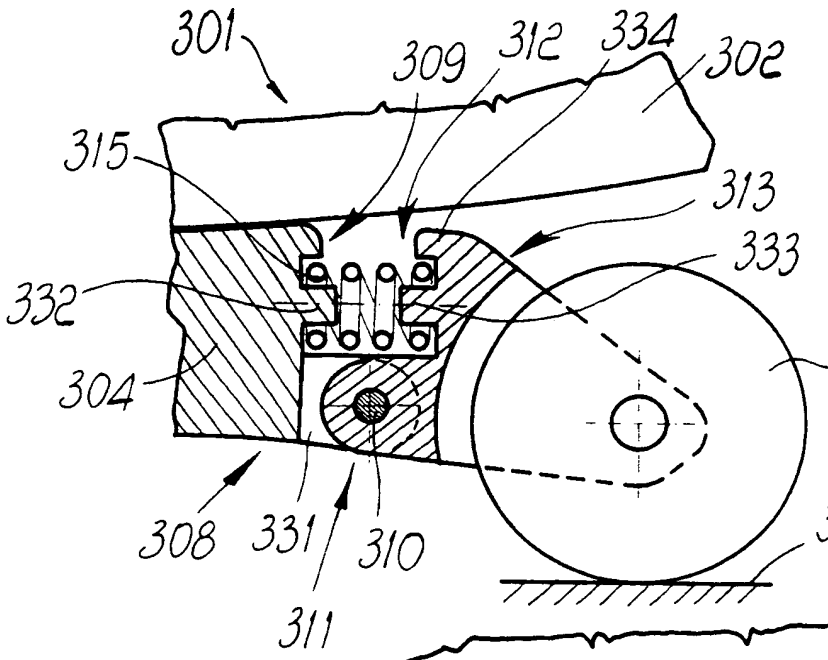

Fig.10

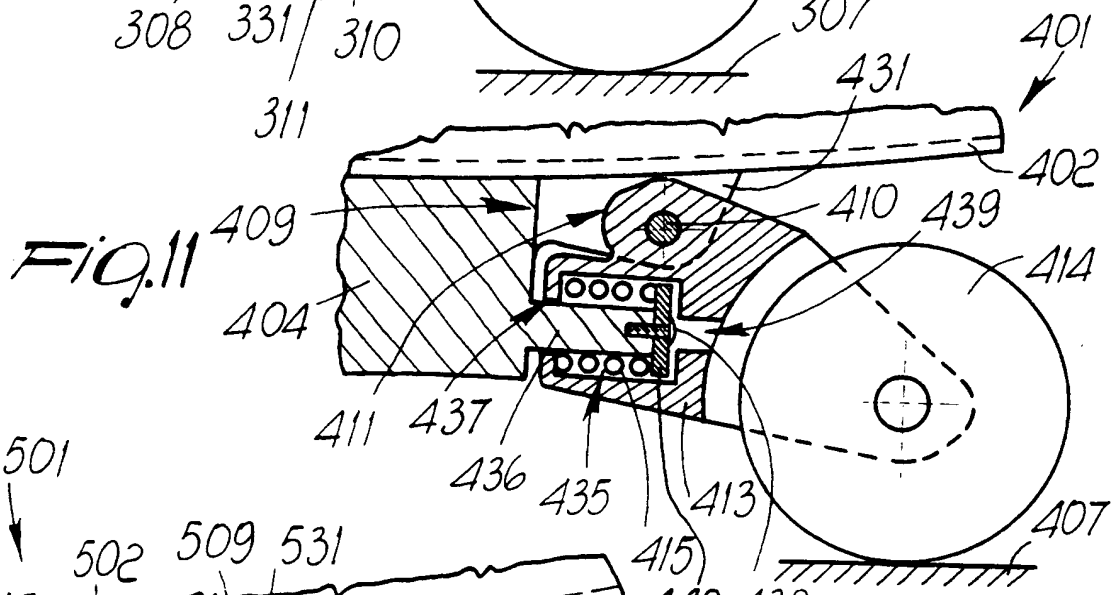

Fig.11

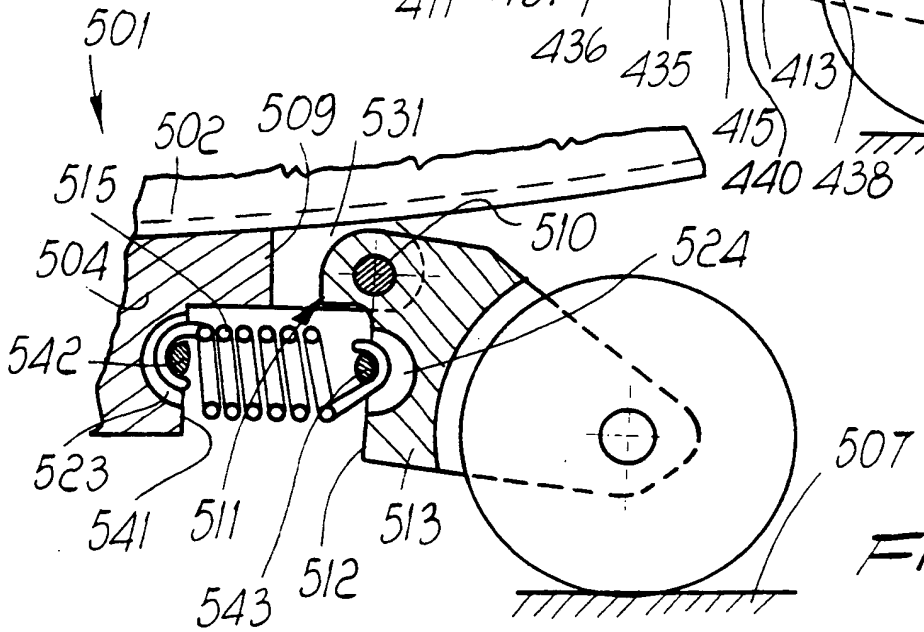

Fig.12

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EUROPEAN SEARCH REPORT

Application Number

EP 93 10 3405

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int. Cl.5)
A	FR-A-2 544 621 (MICHEL) 26 October 1984 * figures 1-3 *	1	A63C17/06
A	DE-C-233 545 (WEISZ) 18 June 1910 * figure 1 *	1	
A	FR-A-2 660 205 (PICARD) 4 October 1991 * page 5, line 4 - line 8; figures 8,9 *	1	
A	EP-A-0 279 131 (MARANDEL) 24 August 1988 * figure 2 *	1	
A	DE-C-654 100 (FISCHER) 25 November 1937 * figure 1 *	1	
P,A	DE-A-4 209 415 (NEUSTEIN) 5 November 1992	1	TECHNICAL FIELDS SEARCHED (Int. Cl.5) A63C

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
THE HAGUE	25 MAY 1993	STEEGMAN R.

CATEGORY OF CITED DOCUMENTS

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